

BUREAU OF ENVIRONMENTAL REMEDIATION/REMEDIAL SECTION
GUIDELINE
FINAL GUIDANCE FOR VERIFICATION SAMPLING OF
NON-HAZARDOUS INDUSTRIAL WASTE WATER PONDS

BER POLICY#BER-RS-006

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PAGES: 7 with attachments

Introduction

This document presents the Kansas Department of Health and Environment (KDHE), Bureau of Environmental Remediation's (BER) general guidance for conducting soil and/or ground water sampling associated with a non-hazardous industrial wastewater pond (pond) closure. This verification sampling guidance applies only to ponds for which preliminary characterization of the pond water or sludge revealed compounds with concentrations in excess of applicable Federal or KDHE guidelines and the presence of such compounds could pose a contamination threat to the soils or waters of the State. This plan does not apply to ponds where the water, soil, or sludge is considered to be hazardous waste.

Characterization and disposal of pond water and sludge must be coordinated with KDHE's Bureau of Water (BOW). Pond closure verification sampling must be coordinated with BER. In addition, if further characterization or remediation of soil and/or ground water contamination is required pursuant to the pond closure, these activities must also be coordinated with BER.

This outline for pond closure verification sampling reflects the minimal amount of characterization necessary to determine the appropriate course of action for pond closure. Submittal of a formal work plan for proposed activities consistent with this guidance is optional. BER will review, provide comments if necessary, and approve sampling verification work plans if submitted. Alternative approaches for verification sampling will be considered only if they are presented in a work plan submitted for KDHE approval. Submittal of post closure reports to BER is mandatory for all pond closures to which this plan applies.

Soil Sampling Requirements

Once the sludge has been removed, soil samples must be collected from the floor and sides of the excavation and submitted for laboratory analysis. The following guidelines present general sampling requirements and the suggested minimum number and locations for soil sampling based on pond size. The pond size ranges listed in the following text are based on the area of the pond at the designed maximum water elevation.

A. General Sampling Requirements for All Ponds:

- 1) Composite sampling will be accepted by BER since costs for adequate characterization using discrete sampling may be significant in the preliminary closure stage. However, BER recommends discrete sampling if it is not cost prohibitive.
- 2) If analytical results from composite samples indicate contamination at levels above their percentage of aliquots comprising the sample; e.g., contaminant concentration in a composite sample derived from four aliquots is greater than 25% of the Federal or State guidelines, or 50% for a two aliquot composite, additional characterization of the soil in the area where aliquots were collected may be required at the discretion of BER.
- 3) If analytical results from discrete sampling indicate contamination in excess of Federal or State guidelines, additional characterization may or may not be required depending the completeness of the sampling verification scope employed at the site. If discrete sampling was conducted in accordance with the approved work plan and to the satisfaction of KDHE, additional characterization will not be required for the area previously sampled.
- 4) During sample collection activities, each aliquot sample must be handled as if it were a discrete sample in accordance with applicable sample collection, handling, and preservation protocol from time of collection through compositing and submittal to a laboratory.
- 5) Pond floor samples and inlet and outlet samples must be collected from the areas where maximum thicknesses of sludge were observed.
- 6) Side wall samples must be collected from appropriate vertical locations where contaminants specific to the pond would most likely have impacted soils; e.g., if petroleum product was discharged to the pond, side wall samples must be collected from one foot below the designed maximum water level elevation or the elevation of the average pond water level. Obvious areas of impact as evidenced by staining, etc., must be sampled.
- 7) Reference "Attachment 1 - Soil Sampling Strategy" for a general illustration of soil sampling strategy as outlined in Sections B through E below.

B. Pond Area less than or equal to 10,000 ft²:

- 1) The pond floor is divided into four quadrants of equal area.
- 2) One aliquot of soil sample is collected from the pond floor surface of each quadrant; equal proportions from each of the four aliquots are combined into one composite sample.
- 3) One aliquot of soil sample is collected from each side wall of the pond; equal proportions from each of the four aliquots are combined into one composite sample.
- 4) One aliquot of soil sample is collected at the point where discharge occurred to the pond (inlet) and one aliquot is collected at the point where discharge occurred from the pond (outlet); equal proportions of the two aliquots are combined into a composite sample.
- 5) This strategy provides for three composite samples to be submitted for laboratory analysis. If more than one analytical method will be required depending on the range of compounds discharged to the pond, three composite samples will be required for each analytical method.

C. Pond Area greater than 10,000 ft² and less than or equal to 43,560 ft²:

- 1) The pond floor is divided in two sectors of equal area; each sector is then subdivided into four quadrants of equal area.
- 2) For each sector, one aliquot is collected from each quadrant and equal proportions from each aliquot are combined into one composite sample. There will be two composite samples for the entire pond floor area.
- 3) One aliquot of soil sample is collected from each side wall of the pond; equal proportions from each of the four aliquots are combined into one composite sample.
- 4) One aliquot of soil sample is collected at the pond inlet and one aliquot is collected at the outlet; equal proportions of the two aliquots are combined into a composite sample.
- 5) This strategy provides for a minimum of four composite samples per analytical method to be submitted for laboratory analysis.

D. Pond area greater than 43,560 ft² and less than or equal to 130,000 ft²:

- 1) The pond floor area will be divided into four primary quadrants of equal area; each primary quadrant is then subdivided into four sub-quadrants of equal area.
- 2) For each primary quadrant, one aliquot is collected from each of the four sub-quadrants and equal proportions from each aliquot are combined into one composite sample. There will be four composite samples for the entire pond floor area.
- 3) Two aliquots of soil sample are collected from each side wall of the pond; equal proportions from four aliquots representing two side walls are combined into one composite sample. There will be two composite samples for the side walls; each of the two composite samples will represent two side walls.
- 4) One aliquot of soil sample is collected at the pond inlet and one aliquot is collected at the outlet; equal proportions of the two aliquots are combined into a composite sample.
- 5) This strategy provides for a minimum of seven composite samples per analytical method to be submitted for laboratory analysis

E. Pond area greater than 130,000 ft²:

- 1) The sampling verification strategy must be proposed to KDHE and must consist of at least the coverage and amount of sampling required for ponds with areas $> 43,560 \text{ ft}^2$ and $\leq 130,000 \text{ ft}^2$.

F. Lined Ponds:

- 1) The sampling strategies described above may need to be adjusted so that samples are collected from areas beneath breeches in the pond liner.

Ground Water Sampling Requirements

Ground water sampling will be required if the vertical extent of contamination is determined to be within 40 feet from ground water. Ground water sampling will be conducted by conventional monitoring well installation and sampling in accordance with the following criteria:

- 1) **Depth to ground water ≥ 40 from surface.** Soil sampling only will be required initially. If soil contamination is found to extend to within 40 feet of ground water

during pond characterization, ground water sampling will also be required.

2) Depth to ground water < 40 feet from surface. Ground water sampling will be required. Monitoring well requirements are as follows:

- a. One monitoring well will be required. The well must be located in the downgradient direction of the pond as close to the pond as practical.
- b. If the pond bottom intersects the water table, three monitoring wells will be required to be installed in a triangular configuration around the pond.

Monitoring wells must be designed and installed to detect, in the ground water, compounds of concern previously detected in the pond water or sludge. The proposed monitoring well installation procedures and design must be included in the work plan and will subject to BER review and approval.

If soil contamination is confirmed not to extend to the water table, a monitoring well may not be required, however, this must be clearly proposed as a contingency in the pond closure work plan and will be approved by KDHE on a site specific basis.

Laboratory Analytical Requirements

The proposed analytical methods for laboratory analysis of soil and ground water samples must be consistent with the compounds of concern detected in the pond water or sludge. The pond closure work plan must indicate the proposed analytical methods. All analyses must be conducted by a KDHE approved laboratory. Attachment 2 lists acceptable analytical methods relative to compounds of concern. In addition, for total petroleum hydrocarbons (TPH) analysis, BER specifies the analytical methods OA-1 and/or OA-2, whichever (or both) is most appropriate for the contaminants of concern.

Verification Sampling Work Plan

If a sampling verification work plan is submitted to BER for review and approval, the work plan must be submitted prior to conducting field activities and it must clearly define the strategy for conducting the pond closure and include at least following items:

- 1) A very brief history of the site describing activities conducted at the site currently and in the past. Provide the location of the site (city, address, etc.) and include a copy taken from a 7.5 minute topographical quadrangle map that depicts the site location; identify the site location on the map.

- 2) A description of the pond including areal dimensions, depths of water and sludge, and designed maximum water level elevation. Discuss how the pond was operated; i.e., describe the waste streams entering the pond, when and where discharge from the pond occurred, locations of maximum thicknesses of sludge, and general sludge distribution.
- 3) A plat, to scale, depicting the pond with pertinent features such as the inlet and outlet locations, pond floor and side walls, areas where maximum thickness of sludge accumulated and, if applicable, areas void of sludge. Include on this plat, or a separate plat, the sampling grid layout, locations proposed for sample collection (aliquots for composites), and the proposed location for a monitoring well(s). If only one well is to be installed, include an arrow depicting expected ground water flow direction.
- 4) Copies of results from laboratory analysis of the pond water and sludge. Provide a brief description of water and sludge sampling procedures employed.
- 5) Provide discussion describing in detail the proposed sampling strategy. If a monitoring well is to be installed, provide documentation on expected ground water flow direction to justify the proposed well location.
- 6) Include a description of proposed monitoring well installation, completion, and development procedures. Provide a schematic diagram of the proposed monitoring well design which includes proposed screen size and interval.
- 7) Describe the proposed laboratory analytical program for soil and water samples providing the specific analytical methodologies to be used. Include discussion to describe proposed sampling procedures and the quality control/quality assurance procedures to be employed. Identify the laboratory that will be conducting the analyses.
- 8) Briefly describe investigative derived waste (soil and water) handling, characterization, and disposal procedures.
- 9) Propose a schedule for conducting the sampling verification.

Notification

If a verification sampling work plan is submitted to BER, BER will either provide comments on the work plan or approve it upon review. If BER has comments or concerns after reviewing a work plan, BER will provide these comments in writing to the indicated contact person. All

comments must be resolved prior to approval of the work plan.

Once the work plan is approved, BER will require seven (7) day prior notice of commencing sampling activities. Notice of the exact date and time verification sampling will be conducted must also be provided to the BER contact person to allow KDHE to be present on site and split sample. **BER strongly encourages providing notification of scheduled sampling activities to the BER contact person regardless of whether a verification sampling work plan has been submitted for KDHE approval.**

Sampling Verification Report

A sampling verification report documenting activities in detail must be provided to KDHE. The report must be adequately detailed to allow KDHE to determine if field activities including sampling, sampling location selection, and laboratory analysis were conducted in accordance with the approved work plan. If a monitoring well was installed, static water levels must be provided and well construction schematics must be included in addition to a copy of the KDHE WWC-5 form. If three monitoring wells were installed, the determined ground water flow direction must be provided. The report must provide, summarize, and discuss the results of all sampling activities.

Sampling Verification Follow-Up

If results from sampling verification activities indicate contamination of soils or ground water in excess of Federal or State guideline does not exist at the site, further characterization will not be required. However, if results indicate contamination in excess of Federal or State guidelines does exist, further characterization of soil and/or ground water contamination may be required. If additional characterization is required by KDHE, the party determined to be responsible for the contamination will be required to sign an Interim Agreement with KDHE which will establish guidelines and objectives for the additional work prior to conducting further characterization.